UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

DATE: NOV 2 2017

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Center Ethanol Company, Sauget, Illinois

FROM: Jason Schenandoah, Environmental Engineer
AECAB (IL/IN)

THRU: Nathan Frank, Section Chief
AECAB (IL/IN)

TO: File

BASIC INFORMATION

Facility Name: Center Ethanol Company

Facility Location: 231 Monsanto Ave, Sauget, Illinois

Date of Inspection: 4/25/2017-4/26/2017

EPA Inspector(s):
1. Jason Schenandoah, Environmental Engineer
2. Luke Hullinger, Environmental Engineer
3. Constantinos Loukeris, Environmental Engineer

Other Attendees
1. Doug Senn, General Manager, Center Ethanol Company, LLC
2. Keith Zarczynski, Compliance Manager, Center Ethanol Company, LLC
3. Denny Crown, Process Manager, Center Ethanol Company, LLC

Purpose of Inspection: To conduct comparative monitoring at an ethanol plant and evaluate for compliance with leak detection and repair (LDAR) requirements under the Clean Air Act.

Facility Type: Center Ethanol Company, LLC (Center Ethanol) owns and operates the Sauget plant, an ethanol production facility, that produces fuel grade ethanol.

Regulations Central to Inspection: New Source Performance Standards for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction,

Reconstruction, or Modification Commenced After January 5, 1981 and On or Before November 7, 2006 40 C.F.R. Part 60, Subpart VV (NSPS VV).

Arrival Time: April 25, 2017 12:48 pm
Departure Time: April 26, 2017 4:30 pm

Inspection Type:
☒ Unannounced Inspection
☐ Announced Inspection

OPENING CONFERENCE

☒ Credentials Presented
☒ CBI warning to facility provided

The following information was obtained verbally from Doug Senn, Keith Zarczynski, or Denny Crown unless otherwise noted.

Process Description:
Corn bushels are received from trucks and are unloaded into storage silos. The corn is then ground into flour. The flour is then mixed with water, alpha-amylase and glucoamylase to create a slurry. The alpha-amylase assists in liquefying the slurry and the glucoamylase helps to break down the sugars. The slurry is then sent into a liquefaction tank to be hydrolyzed and pre-cooked to form the mash. The mash is then pumped into one of four 700,000-gallon fermenters and yeast is added. The fermentation process takes approximately 55 hours to complete. On any given day, two fermenters are undergoing the fermentation process, one is being filled and the last is being emptied into a 1,000,000-gallon beer well. Fermented mash is then pumped into a series of distiller columns to separate a mixture of approximately 95% ethanol and 5% water from the mash via evaporation. The mixture is then sent to a dehydrator to remove the last 5% of water and produce 200 proof ethanol. The ethanol is stored in one of two 169,000-gallon day tanks. The ethanol is denatured by addition of natural gasoline from the 56,400-gallon storage tank. The final denatured ethanol is stored in one of two 587,000-gallon product storage tanks and is sold by the company. The remainder of the mash, after the distillation process, is sent to a centrifuge where wet distiller grain is removed from the process. The remainder is called thin stillage and is sent through additional centrifugal effects to separate corn oil from it. The corn oil is a final product sold by the facility. The remainder is called syrup and is added back to the wet distiller grain. The wet distiller grain then enters a dryer. Water is removed and recycled to the beginning of the process. The wet distiller grain becomes dry distiller grain when there is only about 10 to 12% moisture content remaining. The dry distiller grain is another product that is sold by the company.

Staff Interview: The site is divided into three areas subject to the Leak Detection and Repair (LDAR) program: fermentation alley, Distillation, Dehydration and Evaporation (DD&E) and the storage tank farm. LDAR monitoring is conducted in-house. The Toxic Vapor Analyzer

(TVA) used by Center Ethanol, for LDAR purposes, is a TVA 1000 with both photo ionization detection (PID) and flame ionization detection (FID) rented by Pine Environmental. The TVA unit is calibrated off site and no daily checks are performed. Isobutylene for the PID and methane for the FID are both used to calibrate the TVA, but only the PID has been used during in-house LDAR monitoring. No semi-annual NSPS reports were produced by Center Ethanol. Weekly inspections of pumps have never been completed. Yeast tank was said to not be in operation. Denny Crown said that the amount of time that the flare and ethanol loadout rack are in operation is at least half of the year.

TOUR INFORMATION

EPA toured the facility: Yes

Data Collected and Observations:

- The vacuum breaker on the beer well tank was determined to be leaking as shown by a FLIR® optical gas imaging (OGI) camera and by using a TVA yielding a value of 960 ppmv.
- The agitator on fermentation tank #4 was leaking from the seal; the FLIR camera captured a video of hydrocarbon emissions leaking from the seal. EPA's TVA found a concentration of 40,000 ppmv VOC at the agitator seal.
- The decommissioned yeast tank, TK-3102, had a manway open on top of it. Video was recorded using the FLIR® OGI camera of hydrocarbon emissions escaping from it [Appendix A].
- Tank 6104, the denaturing tank, and tank 6101, the north day tank, were both shown to be venting from the internal floating roof (IFR), these were observed with the FLIR® OGI camera [Appendix A].
- Process Condensate Tank, TK-7601, was shown to have VOCs emitting from it as shown by a video taken from the ground with the FLIR® OGI camera. A closer inspection on top of TK-7601 revealed that the agitator had VOC emissions venting from it. The VOCs were observed using the FLIR® OGI camera and a TVA reading of 5,600 ppmv [Appendix A].
- The manway hatch on TK-7601 was open and contributed to VOC emissions from the tank.
- The tank immediately to the east of TK-7601 had emissions venting from the agitator as shown by a video captured with the FLIR® OGI camera [Appendix A].
- Process Safety Valve (PSV), PSV-43183, had a reading of 2,650 ppmv VOC's
- Process water was observed to flood the fermentation alley location. When asked, Keith said that it sometimes happens when process water is being moved around. He also said that the water is put back into the system. VOCs were detected coming from the process water.

Photos and/or Videos: were taken during the inspection.

Field Measurements: were taken during this inspection.

The following is a list of field measurement data provided in Appendix B:

- TVA 2020 calibration data for two units (ID #'s 56575 and 56584);
- Number of components monitored using Method 21;
- Leaks detected using Method 21;
- List of OELs

RECORDS REVIEW

- 2014 and 2015 Air Emissions Reports (AERs)
  - Electronic copy taken.
  - Potential underestimation of truck loadout and fugitive emissions.
- Method 21 records March 2014-February 2016
  - Electronic copy taken.
  - No recorded leaks over this time frame.
  - Some missing points of data.
- Regenerative Thermal Oxidizer (RTO) stack test
  - Electronic copy taken.
- August 2010 calculation of fugitive leak emissions
  - Electronic copy taken.
  - Calculation uses an estimated number of components. There are more components at the facility than is represented in the calculation.
- Environmental Data Sheet
  - Electronic copy taken.
  - Shows estimations of emission calculations.
- Emissions test – Vent Gas Scrubber
  - Hard copy taken.
- Emissions test – CO_2 scrubber and grain receiving baghouses
  - Hard copy taken.
- Summary of components list
  - Hard copy taken.
  - Nearly 3 times more components than used in emissions calculations from leaking components.
- Annual tank floating roof checks
  - Hard copy taken.
- TVA instrument calibration report summaries
  - Hard copies taken.
  - Report dates: 9/23/2016; 11/29/2016; 12/28/2016; 1/20/2017; 2/23/2017
- Component master list
  - Hard copy taken.

CLOSING CONFERENCE

Requested documents:

- Remaining LDAR calibration reports
    - June 2012 to the present
- Manufacturer's data for control equipment
    - Vent gas scrubber
    - CO_2 scrubber
    - RTO
- Date that facility construction commenced
- Parametric monitoring records of control equipment
    - Vent gas scrubber
    - CO_2 scrubber
    - RTO
- Any NSPS VV/NNN reports and determination

Compliance Assistance:

- EPA informed Center Ethanol of the need for NSPS semi-annual reports.
- EPA informed Center Ethanol of their deviations from method 21.
    - Need to calibrate daily
    - Need to use proper calibration gas
    - Need to use calibration gases at the proper concentrations
- EPA informed Center Ethanol that OELs must be capped.
- EPA informed Center Ethanol that weekly visual checks must be performed on pumps.
- EPA informed Center Ethanol that AERs may be under reported.
- EPA informed Center Ethanol of IFR leaks on two tanks

Concerns:

- Center Ethanol may be subject to NSPS NNN.
- Center Ethanol does not submit NSPS VV semi-annual reports.
- The facility had numerous OELs.
- Center Ethanol had missing and incomplete records for several months of valve and pump monitoring prior to September 2016.
- There are IFR leaks on TK-6101 and TK-6104.
- Center Ethanol may be underreporting their AER due to underestimation of truck loadout and fugitive leak emissions.
- Incorrect calibration gases and calibration gas concentrations are being used for method 21.
- Method 21 monitoring may not be conducted properly based on the number of leaks found by EPA when comparing them to Center Ethanol's historical leak rate.
- PSV-43183 was leaking.
- Center Ethanol is not documenting weekly visual checks on pumps.

SIGNATURES

Report Author: _____ Date: 10/31/17

Section Chief: _____ Date: 11/2/17

APPENDICES AND ATTACHMENTS

1. Appendix A: Digital Image Log
2. Appendix B: Field Measurement Data

Facility Name: Center Ethanol Company
Facility Location: 231 Monsanto Ave, Sauget, Illinois
Date of Inspection: 4/25/2017-4/26/2017

APPENDIX A: DIGITAL IMAGE LOG

1. Inspector Name: Constantinos Loukeris	**2. Date(s) of Inspection:** 4/25/2017-4/26/2017
3. Company/Facility Name: Center Ethanol Company	**4. Street Address, City, State:** 231 Monsanto Ave, Sauget, Illinois
5. Number of Images: 15	**6. Archival Record Location:** CD-R labeled as Center Ethanol; 231 Monsanto Ave. Sauget, IL; 4/25/17-4/26/17; LDAR Inspection

Videos:

Image Number	File Name	Date and Time (incl. time zone and DST)	Description of Image
1	MOV_1751.mp4	4/25/2017 9:34:16 PM	Hydrocarbon emissions imaged from Vacuum breaker on beer well
2	MOV_1752.mp4	4/25/2017 9:37:42 PM	Hydrocarbon emissions from agitator seal leaking on Fermenter #4
3	MOV_1753.mp4	4/25/2017 9:40:10 PM	Open hatch on tank TK 3102
4	MOV_1754.mp4	4/26/2017 2:18:24 PM	Hydrocarbon emissions observed from IFR on TK 6104
5	MOV_1755.mp4	4/26/2017 2:24:38 PM	Hydrocarbon emissions observed from IFR on TK 6101
6	MOV_1756.mp4	4/26/2017 2:32:50 PM	Hydrocarbon emissions imaged from valve 61224 on TK 6106 leaking
7	MOV_1757.mp4	4/26/2017 2:46:18 PM	Hydrocarbon emissions imaged from valve on Southeast base of TK6105 leaking
8	MOV_1758.mp4	4/26/2017 2:54:40 PM	Hydrocarbon emissions imaged from valve on south side base of TK6105 leaking
9	MOV_1759.mp4	4/26/2017 3:24:36 PM	RTO Stack IR Clip
10	MOV_1761.mp4	4/26/2017 3:29:00 PM	Temp Instrument: Hydrocarbon emissions imaged from screwed connector off E4304
11	MOV_1762.mp4	4/26/2017 3:42:10 PM	Hydrocarbon emissions imaged from ethanol liquid U line valve (in closed position) with liquid and vapor releasing

12	MOV_1763.mp4	4/26/2017 3:56:36 PM	Hydrocarbon emissions imaged from Cover on F4402 filter in DD&E section
13	MOV_1764.mp4	4/26/2017 4:19:22 PM	Hydrocarbon emissions imaged from top of tank 7601 (process condensate) imaged from base of tank
14	MOV_1766.mp4	4/26/2017 4:33:26 PM	Hydrocarbon emissions imaged from agitator seal leaking on TK 7601, video also shows agitator of tank immediately to the east with a leaking agitator

Digital Captures:

Image Number	**File Name**	**Date and Time (incl. time zone and DST)**	**Latitude and Longitude**	**Description of Image**
15	DC_1760.jpg	4/26/2017 10:23 AM	38.595217, -90.175933	RTO Stack Digital Clip

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APPENDIX B: FIELD MEASUREMENT DATA

- EPA used two TVA 2020's to conduct comparative monitoring at the Sauget Plant.
- EPA calibrated both TVA 2020's each day before use with the following calibrations gas standards: Zero Air, 500 ppmv as Methane, 2,000 ppmv as methane, and 10,000 ppmv as Methane. The table below summarizes the calibration checks results:

4/25/2017 2:51pm Calibration		
Span Gas (ppmv)	EPA# A56584	EPA# A56575
500	488	497
2000	1982	2018
10000	9947	9867

4/26/2017 8:40am Calibration		
Span Gas (ppmv)	EPA# A56584	EPA# A56575
500	487	483
2000	1974	1972
10000	9823	10000

4/26/2017 12:53pm Bump Check		
Span Gas (ppmv)	EPA# A56584	EPA# A56575
500	454	450
2000	1885	1848
10000	9247	9215

- The Table below summarizes the equipment monitored by EPA at the Sauget Plant:

Equipment Type	Number of Components
Valves	164
Pumps	6
Connectors	24
Open Ended Lines (OELs)	45
Total	245

- Each detected leak was confirmed using the other TVA. The table below summarizes the leaking equipment that was identified by EPA's monitoring using Method 21:

Date	Equipment Identifier	Equipment Type	Reading (ppm)	TVA 2020 ID #
4/26/2017	South End TK-6105	Valve	13,500	56584
4/26/2017	V-61224	Valve	11,300	56575

4/26/2017	Alcohol Process Line DD&E 3rd Floor	Valve	16,000	56575
4/26/2017	TI-43139	Connector	24,900	56575
4/26/2017	F-4402	Filter	12,400	56584

- The table below lists where OELs were located:

Date	Location	Number of OELs
4/25/2017	V31308	2
4/25/2017	Inlet to fermentation tank #3 pump	3
4/25/2017	Inlet to E3106	1
4/25/2017	Outlet of E3106	1
4/25/2017	V31608	2
4/25/2017	Inlet to fermentation tank #4 pump	1
4/25/2017	Inlet to E3107	1
4/25/2017	Outlet of E3107	1
4/25/2017	V31x08 (x was unreadable on tag)	2
4/25/2017	Inlet to fermentation tank #1 pump	1
4/25/2017	V31309	1
4/25/2017	Inlet to E3104	1
4/25/2017	Outlet from E3102	1
4/25/2017	Fermentation tank #4 top line	1
4/25/2017	Fermentation tank #3 top line	1
4/25/2017	Fermentation tank #2 top line	1
4/25/2017	Inlet to E3105	1
4/25/2017	Outlet from E3105	1
4/25/2017	V31417	1
4/26/2017	Near V61108	1
4/26/2017	Near V61102	1
4/26/2017	South end of TK-6105	1
4/26/2017	V43135	1
/4/26/2017	PT-43102	2
4/26/2017	PI-43171	1
4/26/2017	V44104	1
4/26/2017	Valve under V44104	1
4/26/2017	Valve under V44126	1
4/26/2017	V44126	1
4/26/2017	V42115	2
4/26/2017	V44131	1
4/26/2017	V43135	1
4/26/2017	V44132	1
4/26/2017	V44105	1
4/26/2017	V44103	1

4/26/2017	Alcohol liquid line 3rd floor DD&E	1
4/26/2017	Alcohol vapor line 2nd floor DD&E	1
4/26/2017	Near pump on 1st floor DD&E	1